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length of the passage. The same holds true for digits and nonsense syllables, but not to so great a degree; for the number of days needed for 200 nonsense-syllables was considerably greater than that needed for 20. By the "continuous" method, however, we observe that where the 100-word passage was memorized in 9 minutes, the 500-word passage took 52 minutes—nearly 6 times as much time being required, although the passage is only 5 times as long. This is much more strikingly shown when we examine the curve obtained for the digits. Here we see that although it took only 5 minutes to learn 24 digits, it took 2 hours and 34 minutes to learn 200—more than 31 times as long instead of 8. In short it is obvious that the once-per-day method is—to say nothing of giving a far superior retention—far more economical than the "continuous" method. This is especially so for material memorized by motor associations such as nonsense-syllables or digits.

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REVIEWS AND ABSTRACTS OF LITERATURE

The Essentials of Mental Measurement. WILLIAM BROWN. Cambridge: University Press. 1911. Pp. vi + 154.

The structure of Mr. Brown's book, as he himself points out, bears marks of its composite origin. The first three chapters of Part II., originally published in 1910 as a doctorate thesis, deal essentially with some experimental work with mental tests similar to the work of Winch and Burt, prefaced by a disquisition on the theory of correlation and a brief historical survey of the use made of the theory. To these chapters he has added a fourth sketching the possibilities of the use of the method of correlation by psychologists, and a Part I. treating of mental measurements in general. There are also four appendices, giving tables quoted from Fechner, Müller, and Urban, examples of the working out of single and multiple correlations, some regression curves in illustration of one of his earlier chapters, and a copious bibliography.

The result is an abstruse, slightly critical, mathematical treatise on the measurement of variables, rather than the expression of interest in things mental which might be investigated. With the exception of a concise statement of conclusions (pp. 126-27) the author leads one to forget any connection with psychologic functions, since the data supplying the basis for his mathematical elaboration might apparently have been drawn from any convenient source.

As it stands, Chapter I. of Part I. takes up Weber's law, Fechner's work with it, and three general interpretations of the law. Chapter II. sets out

to explain the three psychophysical methods. Clear in the beginning, the treatment becomes involved by the "slightly controversial tone" employed in the discussion of some other mathematicians' formulæ, and by the digressions necessary to set forth his own objections. For purposes of exposition these digressions might have been placed in footnotes rather than embodied in the text. Yet, condensed as they are, they assume considerable facility in statistical methods on the part of the reader, who, if insufficiently prepared, may refer to the more elementary treatments of Titchener, Pearson, Sheppard, Spearman, Urban, and others.

The Introduction to Part II. gives a concise "preliminary view of the method" of correlation, illustrated by examples and two figures. Chapter I. takes up the correlation coefficient, correlation ratio, probable errors, multiple correlation, six short-cut ways of determining correlation, spurious correlation, and the significance of the correlation coefficient. Much of this is beyond any but the "professed psychologist" prepared to undertake quantitative research, especially as the already sufficiently difficult accounts of Yule and others are here very much condensed. Emphasis is laid on the importance of not disregarding skew curves, and a relatively large space is devoted to a discussion of Pearson's criticisms of Spearman's ranking method. Chapter II. is a sketch of the use made of correlation by Wissler, Thorndike, Burt, Pearson, Elderton, and others, but is mainly taken up with Spearman's researches and the author's own refutation of some of Spearman's conclusions and formulæ. Particular notice is taken of the theory of both Spearman and Burt that there may exist a common, fundamental, mental function or group of functions as demonstrated by the hierarchical order of correlation coefficients. Chapter III. embodies the results of Mr. Brown's experiments with three groups of school-children and three of adults, about 260 subjects in all, in ten or eleven mental tests. These were undertaken in order to determine the extent of correlation between simple mental abilities and the relationship between them and general intellectual ability as measured by teachers' judgments, school marks, etc. It is interesting and unusual to find included the Müller-Lyer illusion, and a little disappointing not to find further work with some of Burt's original tests. Full tables are inserted giving results in each test, and correlation coefficients for the various groups separately. Some of the more general of the fifteen conclusions which close the chapter are:—that the Ebbinghaus *Combination* test is a good measure of intellectual ability, that "mechanical memory correlates fairly closely with intelligence," that "correlation between speed and accuracy of mental performance is slightly non-linear," and that "in homogeneous groups of subjects there is no positive evidence of the existence of one central factor." A brief final chapter works out a proof to emphasize the possibility of measuring correlation between complex variables, and for more than two variables.

The author expresses a hope that this book will prove of use to the educationist who has had "a real training in psychology." Such real training would have to be largely along the lines of quantitative research before this little volume could be appreciated. It will be valued by Eng-

lishmen, under the influence of Karl Pearson, and contributors to *Biometrika* rather more, perhaps, than by students and investigators in this country.

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Outline of a Course in the Philosophy of Education. JOHN ANGUS MACVANNEL. New York: The Macmillan Company. 1912. Pp. 207.

This book is a revision and extension of a syllabus used in Teachers College, Columbia University. The leading topics are philosophy, persistent problems and presuppositions of education; the place of education, the individual and society, institutional factors, course of individual development, democracy and education, the school as a social institution, and the intellectual organization of the school. Many subdivisions of these main topics are given and at the close of each chapter is placed a considerable list of references to both ancient and modern books.

The author believes the most "fruitful study of education consists in treating it as an integral part of a wider philosophy of society," and he attempts to show the relation of the educational process to the facts of organic and social evolution. Education as a social institution is defined as "the method by which a particular generation endeavors to incorporate the vital elements of its civilization or culture into the life of the generation that succeeds it." Development is not merely "an unfolding from within, but also an enfolding from without the individual," and environment can not be considered separately. Heredity and environment "are in reality phases of the actual concrete working self." "The fundamental ethical need of men is self-realization." "Self-realization is a process in which the self (*a*) comes to be more completely defined, *i. e.*, individualized; (*b*) but defined through the membership in the larger unity." The functions of education "are (1) the liberation of the individual from himself and (2) the discovery of the individual to himself."

The book has many such aptly worded definitions and statements of truths in accordance with the best educational thought of the times, and those who are interested in correlating their ideas of philosophy and education after the manner of philosophers will appreciate the work highly. There is nothing, however, in the book to give direct aid to those who are studying educational problems in a scientific or practical way.

The ideals of every one who attempts to deal with educational problems are determined by his philosophy of life, whether he has ever formulated it or not. A conscious study of philosophy may be very valuable to an educator by leading him to form broader and truer ideals of life, but after such ideals have been formed the important thing is to interpret and apply them in a concrete form. Men may agree on a theoretical statement and differ radically as to subjects and methods to be used in applying the theory or even as to the results desired. For example, the religious ascetic of older times might, in learning to ignore the body and its desires, have claimed that he was performing the educational function of "the liberation of the individual from himself" and the New England puritan might